

LISTING OF THE CLAIMS

Claims 1-38. (Canceled)

Claim 39 (New): Manufacturing method by micro-machining at least one membrane sensing element for a pressure sensor able to operate at high temperature and to measure the pressure of a hostile medium, comprising the following steps:

(a) producing a layer of monocrystalline silicon carbide on one surface of a substrate containing polycrystalline silicon carbide,

(b) fabricating, on the free surface of the monocrystalline silicon carbide layer, detection means to detect membrane deformation,

(c) fabricating electric contracts on said free surface to connect the detection means to electric connection means,

(d) forming the membrane of said sensing element by removal of matter from the other surface of the substrate so as only to preserve polycrystalline silicon carbide.

Claim 40 (New) : Method according to Claim 39, in which the fabrication of said monocrystalline silicon carbide layer comprises:

transferring a first layer of monocrystalline silicon carbide to said surface of the substrate,

depositing by epitaxy a second layer of monocrystalline silicon carbide on the first layer in order to obtain said monocrystalline silicon carbide layer of controlled thickness.

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Claim 41 (New): Method according to Claim 39, in which the fabrication of said layer of monocrystalline silicon carbide comprises the use of a wafer in monocrystalline silicon carbide in which a layer has been defined by a layer of microcavities generated by ion implantation, said wafer being bonded to said surface of the substrate then cleaved at the layer of microcavities so as only to preserve said layer defined on the substrate.

Claim 42 (New): Method according to Claim 41, in which cleavage of the wafer is obtained by coalescence of the microcavities resulting from a heat treatment.

Claim 43 (New): Method according to Claim 41, in which the bonding of said wafer to the substrate is obtained by molecular bonding.

Claim 44 (New): Method according to Claim 39, further comprising depositing an insulating interface layer on the surface of the substrate containing polycrystalline silicon carbide prior to producing said layer of monocrystalline silicon carbide thereon.

Claim 45 (New): Method according to Claim 39, in which during the membrane formation step, the removal of matter from the other surface of the substrate is conducted using an operation chosen from among mechanical polishing and chemical etching.

Claim 46 (New): Method according to Claim 39, in which before step a) the method comprises the following preliminary steps:

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machining a substrate to obtain a bump of complementary shape to the shape of the desired sensing element as seen from the hostile medium side,

depositing a layer of polycrystalline silicon carbide on the substrate on the bumping side,

levelling the layer previously deposited until the tip of the bump is reached,  
steps a) and d) then being conducted in the following manner:

a) the layer of monocrystalline silicon carbide is formed on the substrate on the side of the levelled layer,

d) the membrane of said sensing element is formed by removing the initial substrate.

Claim 47 (New): Method according to Claim 46, in which said substrate is in silicon.

Claim 48 (New): Method according to Claim 46, in which the fabrication of said monocrystalline silicon carbide layer comprises:

transferring a first layer of monocrystalline silicon carbide to the substrate,

depositing by epitaxy a second layer of monocrystalline silicon carbide on the first layer of monocrystalline silicon carbide in order to obtain said monocrystalline silicon carbide layer of controlled thickness.

Claim 49 (New): Method according to Claim 46, in which the levelling step is performed by mechanical-chemical polishing.

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Claim 50 (New): Method according to Claim 46, in which the fabrication of said layer of monocrystalline silicon carbide comprises the use of a wafer in monocrystalline silicon carbide in which a layer has been defined by a layer of microcavities generated by ion implantation, said wafer being bonded to the substrate on the side of the levelled layer then cleaved at the layer of microcavities so as only to preserve said defined layer on the substrate.

Claim 51 (New): Method according to Claim 50, in which cleavage of the wafer is obtained by coalescence of the microcavities resulting from a heat treatment.

Claim 52 (New): Method according to Claim 50, in which the bonding of said wafer to the substrate is obtained by molecular bonding.

Claim 53 (New): Method according to Claim 46, further comprising depositing an insulating interface layer on the surface of the substrate containing polycrystalline silicon carbide prior to producing said layer of monopolycrystalline silicon carbide thereon.

Claim 54 (New): Method according to Claim 46, in which removal of the initial substrate is obtained by the chemical etching.

Claim 55 (New): Method according to Claim 39, in which before step a) the method comprises the following preliminary steps:

machining a substrate to obtain a bump of complementary shape to the shape of the

desired sensing element as seen from the hostile medium side,

depositing a layer OF polycrystalline silicon carbide on the substrate on the bumping side,

levelling the layer previously deposited until the desired thickness of the membrane subsists above the bump,

steps a) and d) then being conducted in the following manner:

a) the layer of monocrystalline silicon carbide is formed on the substrate on the side of the levelled layer,

d) the membrane of said sensing elements is formed by removing the initial substrate.

Claim 56 (New): Method according to Claim 55, in which said substrate is in silicon.

Claim 57 (New): Method according to Claim 55, in which the levelling step is performed by mechanical-chemical polishing.

Claim 58 (New): Method according to Claim 55, in which the fabrication of said layer of monocrystalline silicon carbide is obtained using a wafer of monocrystalline silicon carbide in which said layer has been defined by a layer of microcavities generated by ion implantation, said wafer being bonded to this substrate on the side of the levelled layer then cleaved at the layer of microcavities so as only to preserve the layer of monocrystalline silicon carbide on the substrate.

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Claim 59 (New): Method according to Claim 58, in which cleavage of the wafer is obtained by coalescence of the microcavities resulting from a heat treatment.

Claim 60 (New): Method according to Claim 58, in which the bonding of said wafer to the substrate is obtained by molecular bonding.

Claim 61 (New): Method according to Claim 55, in which removal of the initial substrate is obtained by chemical etching.

Claim 62 (New): Method according to Claim 55, in which an insulating interface layer is deposited on the levelled layer before the layer of monocrystalline silicon carbide.

Claim 63 (New): Method according to Claim 55 in which, during the formation of the detection means, the remaining part of the monocrystalline silicon carbide layer is removed.

Claim 64 (New): Method according to Claim 39, in which the method being a collective manufacturing method for producing sensing elements from one same substrate, a final substrate cutting step is provided to obtain separate sensing elements.